



Washington State Department of Transportation



American Public Works Association
Washington State Chapter

Technical Commentary for Standard Plan B-1e Catch Basin Type 2

General Information

Background: Catch basins are primarily used to collect pavement runoff and to act as junctions for storm drain systems when a change in horizontal or vertical alignment must occur. Catch basins differ from manholes in that catch basins are constructed with a sump below the pipe invert. The sump collects sediment and debris entering the catch basin through the grate inlet. The collected material is typically removed by the use of a vactor truck. Catch basins differ from grate and drop inlets shown in the B-4 series of the Standard Plans in that the B-4 inlets have much larger grates with more flow capacity. Catch basins differ from the concrete inlet shown in Standard Plan B-26 in that the concrete inlet has no sump to catch sediments that may enter through the grate.

Type 2 catch basins are used when the pipes entering or exiting the catch basin are greater than the allowable diameters specified for the Type 1 series, or when the depth of the storm sewer system exceeds 5 feet. Type 2 catch basins are specified in five diameters: 48-inch, 54-inch, 60-inch, 72-inch, and 96-inch.

On February 7, 1997, Standard Plans B-1e and B-1f were combined, with all of the information placed onto Standard Plan B-1e. Standard Plan B-1f was deleted.

Maximum Pipe Size: The maximum pipe inside diameter (I.D.) that can be placed in a Type 2 catch basin is shown in Table 1. The maximum I.D. is dependent on the diameter of the catch basin, the maximum knockout size, and the outside diameter of the pipe entering the catch basin. The relationship between the inside diameter of the pipe and outside diameter of the pipe varies, depending on the pipe material used.

It is recommended that a gap of 1 to 2 inches be provided between the knockout wall and the outside of the pipe. The gap facilitates pipe installation into the catch basin. Once the pipe is installed, the gap is filled with concrete grout.

Table 1

Manhole Diameter (in.)	Maximum Knockout (in.)	Maximum Pipe I.D. for a Type 2 Catch Basin (in)				
		Concrete ¹	Metal ²	HDPE ³	Solid Wall PVC ⁴	Profile Wall PVC ⁵
48	36	24	30	24	27	30
54	42	30	36			36
60	48	36	42			42
72	60	42	54			48
96	84	60	72			48

1. Reinforced or plain
2. 2 2/3 x 1/2 or 3 x 1 corrugations, steel or aluminum.
3. High density polyethylene Stand Spec. 9-05.20. Not currently approved for storm sewer use in sizes larger than 24 in. I.D.
4. Solid wall polyvinyl chloride Standard Spec 9-05.12(1). Not currently produced in sizes larger than 27 in. I.D.
5. Profile wall polyvinyl chloride Standard Spec. 9-05.12(2). Maximum I.D. currently manufactured is 48 inches

If the inside diameter of the pipe to be used is larger than that shown in Table 1, a larger catch basin must be provided. Catch basins can be produced with diameters up to 144 inches and a maximum knockout size of 120 inches, but the use of structures larger than 96 inches for highway drainage applications is very limited. As a result, catch basins larger than 96 inches are not included on the Standard Plan.

Pipe Alternates: Most contracts allow a number of pipe alternates to be used. The designer must insure that the Type 2 catch basin diameter specified for a location is large enough to accept all of the pipe alternates for that location.

Maximum Depth: The maximum depth for a Type 2 catch basin is limited by the depth that vector trucks can effectively draw material from. This depth is assumed to be 15 feet, measured from the roadway surface to the bottom of the catch basin. The plan shows a dimension of 12 feet maximum for the catch basin barrel and 28 inches maximum for the adjustment section. Adding those two dimensions together will produce a catch basin depth of 14.3 feet, approximating the 15 foot maximum depth for vector trucks pumps.

The 28 inch maximum dimension shown for the adjustment section is measured from the roadway surface to the first step inside the catch basin barrel and is mandated by OSHA safety requirements. In some cases, it may not be necessary to provide a full 28 inches of adjustment section depth. If this occurs, the dimension of the catch basin barrel can exceed 12 feet, but the total depth of the catch basin must not exceed 15 feet, measured from the roadway surface to the bottom of the catch basin.

Flow Rate Through the Catch Basin: The flow rate through the catch basin is generally controlled by either the grate inlet or the pipes entering or exiting the catch basin. The storage capability provided by the catch basin is relatively small and should be ignored in storm sewer calculations.

Minimum Distance Between Knockouts: The minimum distance between knockouts provides enough wall area to keep the catch basin intact during transit, installation, and backfilling. Catch basins are particularly susceptible to damage when the knockouts are being removed in the field. Once the pipes have been installed and grouted into the catch basin, much of the structural integrity is restored. If it is not possible to maintain the minimum distance between knockouts, a larger catch basin diameter should be specified.

Base Sections: There are three different base sections that can be provided for a Type 2 catch basin. The most common type is the precast base with integral riser walls. With this base section, the walls and base are formed and poured together, resulting in a monolithic section, typically 2 to 5 feet tall. Depending on the height, the base section may or may not contain the knockouts. Additional riser sections are placed on top of the base section to develop the full height of the catch basin.

The second type of base section is a precast base slab. The base slab is set in place and fit with an o-ring gasket. The o-ring gasket provides a watertight seal around the base to prevent leakage. A 2-foot riser section is typically placed first to form the sump. A 4 to 5-foot riser section containing the knockouts is placed next, followed by additional risers to develop the full height of the catch basin.

The third type of base section is a cast in place slab. The slab extends 6 inches beyond the outside of the riser sections. A 2-foot riser section is typically placed first to form the sump. A grout fillet is placed on the outside of the joint between the base and riser. The fillet provides a watertight seal and also assists in holding the riser sections in place during installation. Additional riser sections are then placed to develop the full height of the catch basin.

Frame and Grate: The technical commentary for Standard Plan B-2a discusses installing the frame and grate with the flange down or cast into the adjustment section, as described on note 3 of this Standard Plan.

Applicable Specifications

6-02.3	Construction Requirements for Concrete Structures
7-05	Manholes, Inlets, and Catch Basins
9-04.3	Joint Mortar
9-05.15(2)	Metal Frame, Grate and Solid Metal Cover for Catch Basins or Inlets
9-12.4 and 5	Precast Concrete Manholes and Catch Basins

Referenced Standard Plans

B-2a	Metal Frame and Grate for Catch Basin and Inlet
B-2b	Vaned Grate
B-1z	Miscellaneous Details for Manholes and Catch Basins

Other Information

Standard Item Number: 3105 to 3109

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Last Updated: September 17, 1997